Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Academic Year (2022-23)
Year: 3 Semester: V

Program: B. Tech. (Data Science) **Max. Marks: 75**
Subject: Econometric Modelling (Honors) **Time: 10: 30 am to 1:30 pm**
Date: 3rd January 2023 **Duration: 3 Hours**

REGULAR EXAMINATION

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required but justify it.
(7) Draw the neat, labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1	Choose the correct alternative: -	
	1. A variable having more than two possible categories, either ordered or unordered is called a) Polychotomous variable b) Dichotomous variable c) Independent variable d) None of the above	[01]
	2. Socio-economic status (low income, middle income, high income) or Education level (high school, P.G, PhD) are examples of a) Nominal variable b) Binary variable c) Ordinal Variable d) Continuous variable	[01]
	3. Which of the following is/are false concerning LPM model? a) The error terms are not normally distributed b) The error terms are heteroscedastic c) The error terms are homoscedastic and are normally distributed d) Both a. and b	[01]

4. Identify the Model [01]

$$F(z) = \Phi(z) = \int_{-\infty}^{z} \phi(z)dz$$

a) Logit Model
b) Tobit Model
c) Multinomial Model
d) Probit Model

5. For DW test to be valid, the following condition(s) need to be satisfied: [01]
a) There must be a constant term in the regression
b) The regressors must not be non-stochastic or strictly exogenous
c) There must be a lag of the dependent variable in the regression
d) All the above

6. A linear combination of white noise processes is termed as [01]
a) Moving average model
b) Multivariate Model
c) Univariate Model
d) Auto Regression Model

7. A trend that evolves in a perfectly predictable way is called [01]
a) Log-linear trend
b) Exponential trend
c) Deterministic trend
d) Stochastic Model

8. Which test is more flexible to test a single hypothesis? [01]
a) t-test
b) F- test
c) Wald test
d) Chow test

9. The Chow test is valid only under [01]
a) heteroscedastic errors
b) homoscedastic errors
c) both a and b
d) None of these

10. Which of the following is not true for Adjusted R-Squared? [01]
a) It can be negative
b) It cannot be negative
c) It imposes a penalty for adding additional independent variables to a model
d) It is also called R- bar squared

	11. Which is/are most used statistic for measuring multicollinearity? a) Variance Inflation factor b) Tolerance c) Both a and b d) None of these	[01]
	12. When do we use proxy variables? a) when there is a measurement error b) when a variable is omitted from the regression c) when error terms are uncorrelated with x d) when error terms are correlated with x	[01]
	13. Ordinary least square (OLS) model a) could be non-linear in variables b) must be linear in parameters c) need not be linear in the variables d) all of these	[01]
	14. What is Type II error? a) Type II error is not rejecting a true null hypothesis b) Type II error is rejecting a true null hypothesis c) Type II error is rejecting a false null hypothesis d) Type II error is not rejecting a false null hypothesis	[01]
	15. What kind of data can take on any value and are not confined to specific numbers? a) Discrete data b) Continuous data c) Nominal data d) Ordinal data	[01]
Q2 (a)	Define Serial or Auto correlation and illustrate positive and negative serial correlation with graphs. **OR** Write a note on Chow Test.	[07] [07]
Q2 (b)	Derive the test statistic for the Wald Test in Multiple Regression Analysis where $H_0: \beta_2 + \beta_3 = 1; H_1: \beta_2 + \beta_3 \neq 1$	[08]
Q3 (a)	Derive the conditional probabilities of each of the three outcome categories of the dependent variable coded 0, 1, and 2 with 0 as the base category. **OR** What is AR(1)? Derive its Error Covariance.	[07] [07]

Q3 (b)	State and prove Frisch-Waugh-Lovell Theorem to obtain $\hat{\beta}_2$.	[08]
Q4 (a)	What are the 5 assumptions of a Multiple Regression model? Explain in detail. **OR** Explain the concept of Multicollinearity. How is it detected? What could be done in the presence of multicollinearity?	[07] [07]
Q4 (b)	Define and describe the Moving Averages (MA) processes in detail.	[08]
Q5 (a)	Mention and describe all the types of data. **OR** Write the steps for Hausman Test and Test of Endogeneity.	[07] [07]
Q5 (b)	Express the Probit and Logit models with graphs and their respective CDFs	[08]